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Natural  
Heritage  
Institute

114 SANSOME STREET, SUITE 1200  
SAN FRANCISCO, CA 94104  
TEL: (415) 288-0550/FAX: (415) 288-0555  
e-mail: nhi@igc.apc.org

Non-Profit Law and Consulting in Conservation of Natural Resources and the Global Environment

Gregory A. Thomas  
President

July 28, 1997

CALFED Bay-Delta Program  
1416 Ninth St., Suite 1155  
Sacramento, CA 95814

Dear Sir or Madam:

Please find ten (10) copies of an Inquiry Submittal submitted pursuant with the 1997 Category III Request for Proposals. The title of our project is:

*Bay-Delta Estuary Restoration through Upper Basin Flood Attenuation: Demonstrating a New Watershed Assessment Tool in the Upper Feather River Basin.*

We look forward to your evaluation of our project and are hopeful it will lead to the eventual preparation of a formal proposal.

Sincerely,

David R. Purkey  
Senior Hydrologist

cc: Greg Thomas, Natural Heritage Institute

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**A. Project Title:** Bay-Delta Estuary Restoration through Upper Basin Flood Attenuation: Demonstrating a New Watershed Assessment Tool in the Upper Feather River Basin  
**Applicant Names:** Natural Heritage Institute (NHI), San Francisco Estuary Institute (SFEI), and Plumas Corporation (PC) in cooperation with Quincy Library Group (QLG), Feather River CRM Group (CRM), Northern Sierra Field Station (NSFS)  
**Contact:** David Purkey, NHI, 114 Sansome St., Suite 1200, San Francisco, CA 94104

**B. Project Description and Primary Biological/Ecological Objective**

This project will demonstrate how restoration in the Upper Feather River Basin above Lake Oroville can improve the survival of anadromous fish dependent on habitat running from the river reaches below the dam, through the Delta, and out the Golden Gate. Although Oroville Dam defines an upper limit of biological continuity in the Bay-Delta estuary, its operation exerts important control over the downstream aquatic ecosystem. During winter storms and spring runoff, dam operation responds to the rate at which precipitation is translated into runoff and reservoir inflow--the runoff attenuation. In disturbed watersheds, where runoff attenuation has been compromised, larger reservoir releases are needed to create adequate flood control capacity, reducing the water available for ecological restoration later in the season. Upper basin restoration could enhance runoff attenuation, creating reservoir operating flexibility which would facilitate implementation of the Anadromous Fish Recovery Plan (AFRP) restoration actions for the Feather River prescribed by the Fish and Wildlife Service. These include the maintenance of suitable temperatures in the Feather River and the provision of flow related signals for young fish to begin emigration.

During the January, 1997 flood event, Lake Oroville received a peak inflow of over 300,000 cfs prompting the release of 160,000 cfs of water downstream over the spillway, the maximum amount that can be released without causing operational damage. If peak inflows could have been reduced by 5%, then outflow from Oroville could have been reduced by 15,000 cfs to 145,000 cfs. In addition to reducing the magnitude of downstream flooding, retention of this water would have allowed for greater flexibility in realizing elements the AFRP restoration plan. Evidence from the upper watershed suggest that such a degree of attenuation is achievable. Indian Creek drains 500 mi<sup>2</sup> above the North Fork of the Feather River. Targeted restoration already undertaken in several small tributaries of Indian Creek suggest that over 20% of the volume leaving the Indian Creek watershed during January's main runoff event could have been significantly attenuated had restoration been complete across the basin.

Last Chance Creek, an Indian Creek tributary, is an excellent site to scientifically demonstrate the connection between upstream restoration and anadromous fish recovery. At one time, the creek, the target of 11 years of hydrologic and ecological monitoring, meandered for 20 miles through a series of meadows, overtopping its banks at high flow. Human activity prompted severe incision which confined the creek to a deep channel that bypasses flood attenuating meanders and rarely floods. Hydraulically cut off and heavily impacted by grazing, meadow soils are drying up and sagebrush is forcing out the native vegetation which previously facilitated the attenuating processes of interception, decelerated overland flow, and infiltration. We will reclaim meadow meanders and rewater the meadow flood plain along Last Chance Creek with the objective of clarifying the role upper basin restoration can play in an overall ecological restoration strategy for the Bay-Delta system, and quantifying the additional water supply realized from restoration activity in the Sierra.

**C. Approach/Tasks/Schedule**

The project will have three phases: 1. assess the evolution of the flood attenuation function in Last Chance Creek/analyze how undegraded flood attenuation capacity would have influenced reservoir operation under historic conditions and define restoration actions (1 year); 2. implement restoration actions (2 years); and 3. quantify the link between the restoration of incised channels and flood attenuation in the Upper Feather River (10 years). We would seek funding for Phase I in a Category III proposal.

To carry out Phase I we will work directly with NHI trustee Dr. Luna Leopold to:

implement the Bay Area Watershed Science Plan (WSP) developed by SFEI. The WSP guides data collection and analysis to illuminate the changing nature of watershed form and function. This approach differs from prevailing watershed assessment techniques which focus on the current status of a watershed. Instead of simply taking a snapshot of the current situation, the WSP organizes an array of scientific and historic evidence into a moving picture of the interaction between human activity and watershed response. We will follow the analytical steps in the WSP to enhance our understanding of the evolution of Last Chance Creek in response to the interaction between natural processes and human operations. The WSP will help us quantitatively evaluate the impact of grazing practices, railroad construction, and logging on the flood attenuation function of Last Chance Creek. This information will guide the development of restoration actions and the establishment of a monitoring program to measure progress towards restoration objectives. This critical step, often missing from restoration efforts, will keep us from spending time and money pursuing restoration options which have little potential to enhance flood attenuation and promote anadromous fish recovery.

Moreover, in implementing the WSP we will provide education and training to insure the direct participation of local entities in this project. Local participation will close the information gap common to watershed assessment which stems from the inability of distant researchers to monitor conditions during and immediately following major storm events.

#### **D. Justification for Project and Funding by CALFED**

The Feather River has an AFRP production target of 170,000 fall-run chinook salmon, four times the 1967-1991 average of 47,000. The AFRP working paper laid out concrete actions for the Feather River echoed in the restoration plan for the river. Half of the restoration action proposed for the Feather River relate to conditions in or immediately below the low-flow channel downstream of Oroville Dam. These actions are contentious as they would increase the flow remaining in the Lower Feather River reducing diversions through the Thermalito Complex which contributes to power generation and provides important regulating storage capacity used to coordinate Feather River supply with downstream demand. Flood attenuation in the Upper Feather would facilitate the implementation of these actions to the benefit of anadromous fish.

#### **E. Budget Costs and Third Party Impacts**

We would seek Category III funds for Phase I of this project. A first budget estimate for Phase I is \$180,000. Third party impacts of restoration actions will be assessed in Phase I.

#### **F. Applicant Qualifications**

Dr. Luna Leopold is a world renowned hydrologist. NHI has experience in scientific and institutional issues related to watershed management. SFEI has scientific expertise in a wide array of disciplines relevant to watershed science. PC plays a key role in developing resource management strategies in Plumas County. QLG crafts consensus around local issues of forest and watershed health. The members of the CRM have decades of ecological research experience in the Upper Feather River. NSFS has collected ecological data in the region and can mobilize manpower for implementation of the WSP.

#### **G. Monitoring and Data Evaluation**

In addition to demonstrating the link between upper basin restoration and anadromous fish recovery, this project will demonstrate a powerful analytical tool for monitoring and data evaluation which can be used across California to conduct watershed assessments and guide restoration and management activities. Phase I is all about rigorous data evaluation.

#### **H. Local Support/Coordination with other Programs/Compatibility with CALFED Objectives**

An important aspect of the WSP is that it was designed to promote public participation in watershed planning and protection. Our program will provide a tool for long-term management and protection of the Upper Feather River watershed. This will help in coordinating the variety of programs with which local entities are already involved. These are administered by the USBR, the Forest Service, the Fish and Wildlife Service and the State Board, and are complimentary to the CALFED long term objectives.